AN INVESTIGATION OF THE ZONE OF PROXIMAL DEVELOPMENT FOR READING PLACEMENT

BY

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In memory of my father

Ray F. Holt

whose warmth, kindness, and sense of
humor touched the lives of those who
were fortunate enough to know him.

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This study was conducted to investigate L. S. Vygotsky's concept of the zone of proximal development as it applies to reading diagnosis and placement. The primary purpose of the study was to establish Emergent Reading Levels as a zone of mediated reading functioning beyond the instructional reading level. Assessment of Emergent Reading Levels included identification of an effective type of mediated reading assessment situation and selection of a comprehension error range criteria.

The second purpose of this study was to investigate the measurement of students' verbal zones of proximal development. The verbal zones were ranges of students' acceptable language functioning, before frustration occurred. The relationships between mediated verbal zones,

static nonmediated verbal zones, and Emergent Reading Levels were investigated.

Twenty-four third graders of average reading achievement were matched on verbal intellegence (IQ) scores and randomly assigned to a mediated experimental group or a nonmediated control group. Subjects were administered an Informal Reading Inventory (IRI) pretest at passage levels three, four, five, six, and seven. The experimental group was administered two mediated IRI posttests at passage levels four, five, six, and seven. Mediation on the first passage was story schema development, and mediation on the second passage was story schema with vocabulary development. The control group was administered two nonmediated IRI postests on the same passages.

Static nonmediated verbal zones were measured with a verbal concepts identification IQ test. A sentence context was added to the verbal IQ test to measure mediated verbal zones.

The results of the study indicated that average third-grade readers' Emergent Reading Levels included a zone of four levels upward from instructional reading level. Diagnosis of Emergent Reading Levels requird a story schema with vocabulary development mediated IRI that was interpreted with an adjusted comprehension error range criteria.

The results also indicated that sentence context mediated verbal zones of average third grade readers were higher than their nonmediated verbal zones. A relationship between students' mediated verbal zones and Emergent Reading Levels was not found in this study.

CHAPTER I
INTRODUCTION

A classroom diagnosis for reading instruction in elementary school grades involves determining the student's current or actual developmental level of functioning for placement in reading instructional materials. The concept of instructional reading level introduced by Betts (1943) signifies a hierarchical developmental level of functioning, levels preprimer to eight, at which reading instruction is aimed.

Instructional reading level is measured by an Informal Reading Inventory (IRI) that consists of passages of increasing linguistic complexity with accompanying comprehension questions to be read and answered by the student. It is assumed that students' levels of reading processing skill coincide with the levels of linguistic complexity inherent in the IRI passages. The IRI is a static testing instrument in that it measures a student's current reading skill by determining the difficulty level of the material that can be read independently (i.e., without any adult prompting or assistance).

An alternative perspective on diagnosis and placement for reading instruction can be drawn from Soviet

psychology, specifically, L.S. Vygotsky's cognitive developmental theory (1962). His theory stresses the role of language and adult facilitation in child development. According to this view, intellectual and psycholinguistic development are based on social interaction between adult and child (Luria, 1978; Luria & Yudovich, 1971; Wozniak, 1975). This emphasis on intellectual growth through social interaction between adult and child would seem to require a dynamic testing model (Budoff, 1972; Feuerstein, 1978), one that assesses the level of performance a student may achieve under the conditions of adult guidance and assistance.

Vygotsky (1978) addressed the issues of diagnosis and instruction with a new concept indicative of the child's emerging mental functioning--what he termed "the zone of proximal development." The zone of proximal development was defined by Vygotsky as the difference between a student's actual developmental level, as determined by independent functioning, and a higher level of potential development as determined through functioning under adult guidance or in collaboration with more capable peers. These levels of emerging mental functioning (a) designated the student's level of performance in a mediated situation (i.e., under adult guidance or in collaboration with capable peers), and (b) came to the surface for observation and diagnosis when the child was engaged in a highly

challenging learning task. Applying Vygotsky's concept to reading instruction, the zone of proximal development represented the range of reading levels created by the difference between the level of unaided reading performance a student has achieved (i.e., instructional reading level), and the highest level she or he could achieve with adult or peer aid (Powell, 1982, 1984).

Dixon, Stanley, and Powell (1984a, 1984b) introduced Emergent Reading Levels that encompass the student's range of aided reading performance or potential reading development. These Emergent Reading Levels were measured by a dynamic IRI testing instrument, one that assessed student performance in a mediated situation using a reading task that was highly challenging for the child. Before Emergent Reading Levels could be recommended as educational policy for reading placement, further investigation was needed to establish the relationships between Emergent Reading Levels, instructional reading level, and the zone of potential verbal development.

Statement of the Problem

The global purpose of this study was to investigate Vygotsky's concept of the zone of proximal development as it applies to reading diagnosis and placement. Due to the lack of experimental research on assessment for reading diagnosis and placement within the zone of proximal development, this study focused on a series of purposes related to reading assessment within the zone.

The first purpose of this study was to reaffirm the construct Emergent Reading Levels (Dixon et al., 1984b; Powell, 1984) as a zone of mediated reading functioning beyond the instructional reading level. Did students operating in a dynamic testing model IRI perform at higher reading levels than students operating in the traditional static testing IRI model? In other words, a dynamic testing model was used in an attempt to expose students' zones of proximal development for reading functioning.

Vygotsky (1962) explained cognitive development, especially the development of elaborated or generalized concepts, as the result of the child's engagement in mediated external social activity (see Chapter II of this research report for a discussion of Vygotsky's theory of cognitive development). An investigation of the relationship between cognitive development, reading development, and the mediated reading assessment situation posed an additional subproblem concerning Emergent Reading Levels. Mediated reading assessment situations that focused on the development of story schema (McConaughy, 1980), the development of vocabulary, or a combination of both story schema and vocabulary development to aid the comprehension of narrative texts were compared.

In an attempt to reaffirm the construct Emergent Reading Levels, the following three questions were addressed in this study:

1. Was a dynamic testing model effective in exposing students' zones of proximal development for reading functioning?
2. Was there a comprehension error range established to interpret Emergent Reading Levels?
3. What type of mediation was most effective in exposing students' Emergent Reading Levels?

The second purpose of this study was to investigate a means of measuring a student's verbal zone of proximal development using a mediated verbal intelligence (IQ) test. The difference between a student's static zone of verbal development as determined by a static verbal IQ test and a higher zone of potential verbal development as determined by a mediated verbal IQ testing situation was investigated. The following question was addressed in this study to establish the existence of a mediated verbal zone of proximal development:

4. Was a mediated verbal zone of proximal development above the static zone exposed?

The relationship between a measurement of students' verbal zones of proximal development and reading placement designated a verbal zone subproblem for investigation. The relationships between students' verbal zones of proximal development and their Emergent Reading Levels were investigated. The final question in this study addressed this relationship as follows:

5. What was the relationship between the mediated verbal zone and Emergent Reading Levels?

Hypotheses

Six hypotheses, stated in the null form, were tested in this study.

Hypothesis I.

There is no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses on both story schema and vocabulary development and instructional reading level measured by the traditional static Informal Reading Inventory.

Hypothesis II.

There is no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on story schema development, and instructional reading level measured by the traditional static Informal Reading Inventory.

Hypothesis III.

There are no differences between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on vocabulary development, Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses on story schema plus vocabulary development, or Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on story schema.

Hypothesis IV.

There is no difference between static verbal zones measured by the Quick Test and mediated verbal zones measured by a mediated dynamic Quick Test.

Hypothesis V.

There is no relationship between mediated verbal zone scores measured by the mediated Quick Test, and the Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses on story schema plus vocabulary development.

Hypothesis VI.

There is no relationship between verbal zone scores measured by the mediated Quick Test and Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses on story schema.

Significance of the Problem

Vygotsky's concept of the zone of proximal development represented the area immediately above students' current developmental level. According to Vygotsky (1962), these higher levels the child can reach when functioning with assistance in the form of adult or peer aid were the levels at which instruction in school subjects should be aimed.

If the concept of the zone of proximal development is applied to diagnosis and placement for reading instruction, the traditional concept of instructional reading level seemed incomplete and problematic. All sets of existing criteria for interpreting errors and placement at the

instructional reading level produced too low a level of placement (Powell, 1982, 1984) because instructional reading level was not obtained under the conditions of instruction or adult mediation. More evidence was needed to support Emergent Reading Levels as a new construct which encompasses the levels a pupil can sustain under adult mediation (Dixon et al., 1984b).

Limitations

The sample population was restricted to third grade students who were of average reading achievement and attended a small urban elementary school. The results were applicable only to populations similar to this sample population.

The mediated IRI was a narrative instrument constructed by the experimenter using a contingency approach to mediation. Findings about Emergent Reading Levels may be generalized only to diagnostic situations which employed this contingency approach to mediation with narrative materials. These findings about Emergent Reading Levels indicated a measure of reading placement at which students may operate successfully with aid. Generalizations drawn from this mediated diagnostic situation should not be applied to nonmediated reading instruction situations.

Definition of Terms

Since Vygotsky's theory of child development is relatively new to the western psychological and educational

literature, the terminology of this study may be extremely unfamiliar to most readers. In order to make the basic principles of Vygotsky's theory and this investigation more comprehensible, a list of pertinent terms and their definitions is provided. The following defined terms are divided into the three categories of (a) intellectual development, (b) mediation, and (c) reading. The terms are presented in a progression designed to foster reader understanding of the basic concepts relevant to this investigation rather than in alphabetical order.

Intellectual Development

Actual developmental level. The child's level of independent mental functioning; automated or mechanized psychological processes (Vygotsky, 1978).

Static testing instrument. An instrument which tests the child's independent mental functioning; a static IQ test (e.g., the Stanford-Binet) which presents verbal or problem solving tasks for the child to complete independently without any assistance.

Higher mental functions. Advanced intellectual operations in humans (e.g., voluntary memory, voluntary attention, and thinking).

Zone of proximal development. Levels of mental functioning currently in the state of development; the distance between the child's actual developmental level of independent problem solving and the upper threshold of

emerging developmental level or problem solving with assistance.

Mediated assessment situation. Verbal or problem solving activities, with adult planning and directing organizational cues, designed to tap the child's zone of proximal development.

Mediated verbal IQ test. A test designed to test the child's levels of emerging verbal functioning rather than an actual developmental level of verbal functioning; it includes adult planning and directing organizational cues.

Dynamic Testing Model. (see mediated assessment situation).

Spontaneous concepts. The child's idea of reality developed primarily through her own mental efforts in the course of everyday activity which includes interaction with parents or adults.

Scientific concepts. Organized bodies of systematic knowledge, within a specific discipline, which the child cannot usually see or experience, developed within a culture over a long period of time, and imparted to the schoolchild through instruction.

Qualitative concept restructuring. The formation of human consciousness or the deliberate awareness of a concept such as "likeness" or "differences" through a process of formulating abstractions and generalizations within a context of social interaction which includes dialogue with an adult.

Quantitative development. An accumulation of conditioned reflexes or maturation which does not generally include the element of deliberate awareness of a concept.

Interpsychological plane. External activity which includes social dialogue or communication between two or more humans.

Intrapsychological plane. Internal mental activity, such as voluntary memory which developed previously within a context of social dialogue during external activity.

Internalization. The formation of deliberate awareness or consciousness first on the external social plane and then on the internal individual plane.

Mediation

Sign. Something which represents an object, set of objects, phenomena, etc.; a word is a sign.

Sign system. A set of signs and a system of rules regulating how to combine these signs.

Semiotics. The study of signs and sign systems used for communication.

Shared social reality. In communication, the social world of the sender of a message is connected with that of the receiver of a message because both sender and receiver are operating within a common sign system.

Socially elaborated meanings. Signs which have been elaborated and generalized through a process of socio-historical development within a culture.

Social interaction. External activity between humans which includes verbal communication made possible because those involved in the activity are operating in the collective using a common sign system.

First. A being, or something which exists in itself.

Second. An existant in dyadic relation to something else.

Third. The being that has an overriding purpose of mediating a particular relationship between two further things in a triadic set of categories.

Contingency approach to mediation. A teacher, acting as a third, builds a relationship between the student and a problem solving or verbal task. The teacher prespecifies the nature of the relationship to be built, foregrounds the pertinent perspectives and topics of the task as well as the strategic patterns of reasoning through the task through external social dialogue with the student.

Reading

Readability. Ease of understanding or comprehension because of style of writing; an estimate of the difficulty level of a text based on vocabulary and syntactic difficulty.

Reading placement. The assignment of a student to a reading level or reading group for purposes of classroom instruction.

Reading diagnosis. Identification of students' strengths and weaknesses to be used for planning instructional activities.

Diagnostic reading task. A reading activity used to assess students' reading ability.

Instructional reading task. A reading activity used to develop a student's reading skill.

Developmental reading instruction. The traditional elementary classroom reading program based on movement of students through successive hierarchically leveled basal reading texts.

Informal Reading Inventory (static). A series of graded passages with accompanying comprehension questions used to assess students' levels of reading functioning without any adult assistance.

Instructional reading level. The grade level of material that is challenging but not frustrating for the student to read successfully with normal classroom instruction or support.

Independent reading level. The grade level of material that the student can read fluently with high comprehension and no assistance.

Frustration reading level. The grade level of material that is too difficult to be read successfully by a student.

Emergent Reading Levels. Higher grade levels of materials which a student can sustain under adult mediation.

Mediated Informal Reading Inventory. A series of graded passages with accompanying comprehension questions, which includes adult planning and directing organizational cues, designed to assess the student's Emergent Reading Levels.

Zone of proximal development for reading. The distance between the student's actual developmental reading level (i.e., instructional reading level) and the upper threshold of adult assisted reading performance.

Mediated reading assessment situation. Reading assessment activities, that include adult planning and directing organizational cues, designed to tap the student's zone of proximal development for reading.

Story schema. A conceptual system for understanding the progression of a story grammar (i.e., relations among episodes in a story).

CHAPTER II
THE LITERATURE REVIEW

The literature reviewed in this chapter presents the theoretical basis of a new perspective about reading development and reading diagnosis and placement. This perspective is built on the assumption of an intimate relationship between intellectual growth, language growth, and reading growth. It is grounded in the work of L.S. Vygotsky (1896-1934).

This review begins with some basic psychological and philosophical tenets of Vygotsky's cognitive developmental theory. The role of semiotics and the role of social interaction are included in the theoretical discussion of Vygotsky's theory.

The review continues with a discussion of the zone of proximal development. A summary of Vygotsky's view of the interaction between learning and intellectual development, the assessment procedures for measuring the zone, and the available Western research related to the zone of proximal development are included in this section. The review concludes with an analysis and summary of the research on measurement of the zone of proximal development for reading placement for classroom instruction.

Vygotsky's Socio-Cultural Theory of Cognitive Development

In his paper "The Genesis of Higher Mental Functions," Vygotsky (1981) began with Buhler's three stage theory of behavior development as the foundation for studying mental phenomena in an ontogenetic framework. In this discussion the first stage, instinct or innate behavioral modes, represented the genetic store of inherited human behavior. The second stage, the training stage, included conditioned reflexes or habits acquired through personal experience. The stage of intellect, the third and highest stage, included intellectual responses that fulfilled the function of active adaptation to new conditions.

Vygotsky (1981) criticized the prevalent contemporary theories of child psychology (e.g., Piagetian theory) for an overemphasis on the first two stages in the analysis of child thought. For Vygotsky, the instinct and training stages were basically the unfolding of growth and maturation. They represented the gradual quantitative accumulation of various changes the child passively undergoes in development.

According to Vygotsky (1981), the study of the development of higher mental functions in children focused on the third stage, intellectual responses. Vygotsky claimed that the development of behavior at this higher level arose "from actual collision of the organism and the

environment and from active adaptation to the environment" (Vygotsky, 1981, p. 152). For Vygotsky, child development was a complex process that involved a qualitative restructuring of mental functions due to active adaptation to the environment. Identification of these qualitative changes and conversions involved in the child's development (Vygotsky, 1981) was the focus of Vygotsky's theory. Determining what types of experiences produced what kinds of transformations of human consciousness was the fundamental objective of all Soviet psychology (Cazden, 1980).

Soviet psychologists (Leont'ev, 1981, Luria, 1981) criticized the traditional view of child development in that it failed to acknowledge the relationship between external and internal activity. Wertsch (1981a) pointed out a dichotomy between the Cartesian assumption that the true domain of psychological study was internal mental function and behavioristic assumption that external activity was the only object of psychological study. The Vygotskian view acknowledged a developmental relationship between external and internal activity whereby "external processes are transformed to create internal processes" (Wertsch, 1981a, p.4). Vygotsky investigated this transformation from external to internal processes through an analysis of semiotics and social interaction in human activity.

Semiotics

Vygotsky emphasized the role of semiotic analysis in his investigations of the development of mental functioning. In his personal notebooks in 1932, Vygotsky remarked that the analysis of signs was "the only adequate method for analyzing human consciousness" (cited in Wertsch, 1980).

Semiotics, the science of signs, originated from the works of the American logician Charles Sanders Peirce and the Swiss linguist Ferdinand de Saussure. Peirce developed the following concept of sign:

> A sign, representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. (Peirce, 1932, p.135.)

Saussure (cited in Lekomcev, 1977) described a sign as a bond between two mental points, the signifier and the signified. Lekomcev (1977) added that a sign system consisted of a set of signs and a system of rules regulating how to combine these signs.

Lucid (1977) defined semiotic science as the study of sign systems and their relation to external reality. He pointed out that the basic assumption which underlies semiotic studies is that sign systems reflect the phenomena of social life and model the world. Lucid described the

topic of semiotics as a combination of meaning and communication.

According to Vygotsky (1981), the original function of a sign was social or a means of communication. Rommetveit (1974) claimed that in communication a bridge between seperate social worlds is formed, creating an intersubjectively established shared social reality. He explained this intersubjective shared social reality as the social world of a sender of a message (e.g., speaker, author, etc.) bridged with the social world of the receiver (e.g., listener, reader, etc.). For Vygotsky (1981), the sign was the element which mediated a connection or relationship between the two individual social systems.

Ivanov (1977) stated that sign systems distinguish the behavior of man from animal because they allow man to take part in a verbalized collective. He pointed out that individuals use sign systems to transmit information and control their behavior in situations linked to performance in the collective (Ivanov, 1977).

Social Interaction

For Vygotsky, language and perception were linked because he viewed the sign as the instrument of psychological activity (Vygotsky, 1978). His theory was based on the principle that the development of higher mental functions in humans (i.e., voluntary memory, voluntary attention, and thinking) occurred in a social

context mediated by signs (Vygotsky, 1981). Luria (1976) elaborated on the mediational role of signs and the sign system of natural language in the development of thought.

> Language is the most decisive element in systemizing perception; insofar as words are themselves a product of sociohistorical development, they become tools for formulating abstractions and generalizations, and facilitate the transition from unmediated sensory reflection to mediated rational thinking. (Luria, 1976, p.49)

As Wertsch (1981b) pointed out, Vygotsky's concept of internalization was based on the formation of human consciousness through the mastering of semiotically mediated processes (i.e., formulating abstractions and generalizations) in social interaction. Vygotsky stated his concept of internalization in his general genetic law of cultural development.

> Any function in the child's cultural development appears twice or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between two people as an interpsychological category, and then within the child as an intrapsychological category. (Vygotsky, 1981, p.163)

For Vygotsky, all higher forms of internal mental activity were at one time external social activity.

In his explanation of Vygotsky's concept of internalization, Leont'ev reflected, "consciousness is <u>co-knowledge,</u> as Vygotsky loved to say. Individual consciousness can exist only in the presence of social consciousness and language" (Leont'ev, 1981, p. 56). For

Leont'ev, language was the means of social interaction as well as the medium for transmitting socially elaborated meanings. He claimed that the meanings did not produce thought but mediated it in a social context (Leont'ev, 1981).

Vygotsky characterized word meanings as dynamic in that they become more elaborated and generalized through external social interaction as the child develops (Vygotsky, 1962).

> In order to transmit some experience or content of consciousness to another person, there is no other path than to ascribe the content to a known class, to a known group of phenomena, and as we know this necessarily requires generalization. Thus it turns out that social interaction necessarily presupposes generalization and the development of word meaning , i.e., generalization becomes possible with the development of social interaction. (quoted in Wertsch, 1981b, p.17)

According to Vygotsky, psychological development was a progressive transfer from external social activity mediated by signs to internal control. Wozniak (1980) added that as the child operated with words in a social context, he or she developed the capacity to detach practical activity from the specific social context by abstracting, generalizing, and internalizing the structure of the activity. These internalized structures guided and directed the child's activity in succeeding social contexts, and the cycle of interpsychological functioning to intrapsychological functioning continued.

The Zone of Proximal Development

Vygotsky's view of development as a transformation from interpsychological functioning to intrapsychological functioning conflicted with the traditional relationship between learning and development. Vygotsky (1978) criticized Binet and Piaget because they characterized development as an innate process of maturation that is a prerequisite for learning. He also criticized the behaviorist view of learning as a process of habit formation due to environmental conditioning.

According to Vygotsky (1962), both stage theorist and behaviorists view development "retrospectively" (p.86). They addressed only the actual developmental level, or the level of a child's current mental functioning that was the result of already completed mental cycles. For Vygotsky, this actual developmental level represented the child's level of independent mental functioning.

Vygotsky (1978) viewed development "prospectively" (p.87) as the levels of mental functioning currently in a state of formation. For Vygotsky, these higher levels of emerging mental functioning represented the child's zone of proximal development. Vygotsky defined the paramaters of the zone of proximal development as encompassing the distance between the child's actual developmental level of independent problem solving and the upper threshold of potential development or problem solving with assistance.

Learning and the Zone of Proximal Development

Vygotsky (1978, 1981) proposed that an interaction between learning and intellectual development took place when the child was operating within his or her zone of proximal development. Vygotsky used his concept of internalization to explain this interaction between learning and intellectual development as follows: (a) the child was engaged in problem solving or learning activities within her zone of proximal development; (b) these learning activities included external verbal social interaction in the form of adult guidance or collaboration with capable peers, activity on an interpsychological plane; and (c) as the learning activity proceeded, the planning and directing structure of these problem solving activities became internalized to activity on an intrapsychological plane. For Vygotsky, instruction aimed at the child's zone of proximal development led the child to new levels of intellectual development or independent functioning (Vygotsky, 1978).

Wertsch (1980) investigated a 2-1/2-year-old child's movement from other-regulative cognitive functioning to self-regulative cognitive functioning. He interpreted data on social and egocentric speech, as well as nonverbal behaviors indicating inner speech. The data were collected while the girl and her mother were engaged in a problem solving activity. The activity included the girl and her

mother working together to insert pieces in a "copy" puzzle so that it would be identical to a model puzzle.

The data came from three episodes of interaction. Wertsch defined an episode as "the verbal and nonverbal interaction that occurred in connection with the identification, selection, and insertion of a piece in the copy puzzle" (Wertsch, 1980, p.155). In the initial segments of the first two episodes, the child directly asked the mother for help, and the mother directed the child's attention to the model puzzle in external social dialogue. Wertsch found that in the third episode, the child internalized the directive and planning function previously provided by the mother through social dialogue. That is, the child carried out the activity independently using both egocentric and inner dialogue without asking for direct assistance from her mother.

Asseessment of the Zone of Proximal Development

Vygotsky (1978, 1962) suggested that the assessment of the status of a child's mental development must include a clarification of two levels, the actual or current developmental level and upper threshold of the zone of proximal development. He claimed that assessment of the distance between the actual developmental level and the upper threshold of the zone of proximal development must include the child's engagement in a highly challenging learning task under the condition of adult mediation

(i.e., adult planning and directing through external social interaction).

Luria (1961) criticized the use of static principles for assessment of the child's intellect and abilities. For Luria, the extent to which a child could perform a given task on her own was not the appropriate methodology. He suggested a three step method of analysis which included (a) evaluation of the child's initial independent performance of a task, (b) camparison of the initial independent performance with direct adult assisted performance or mediation, and (c) comparison of initial independent performance with subsequent independent performance following adult mediation. This final step yielded a range of potential development or the ability to profit from adult provided organizational cues. According to Luria (1961), this method of analysis followed the procedures laid out by Vygotsky for investigating the child's zone of proximal development.

Wozniak (1980) reviewed two experiments which were reported in the Soviet psycho-educational journal Defectologia in Russian. These experiments illustrated the method in which the zone of proximal development concept was actually applied in Soviet research (i.e., according to Luria's three-step method of analysis).

In the first experiment, Egrova (cited in Wozniak, 1980) used the three-step assessment method with 20 normal,

30 learning disabled, and 20 mentally retarded second and fourth graders. Subjects were engaged in an analysis of a visual display task.

In the first step, subjects were instructed to look at a color drawing of a cherry tree branch and describe in detail what had been drawn, how many objects there were, what were the details of color, shape, arrangement, etc. A measure of the child's visual analytic ability consisted of the number of features he or she described. Significantly different means of 12.5 for normal children, 6.5 for learning disabled children, and 4.5 for retarded children were reported. Individual scores were divided into high, medium high, medium low, and low categories. All normal children scored in the highest two categories, all learning disabled children scored in the middle two categories, and all mentally retarded children scored in the middle and low categories.

In the second step of the experiment, subjects were presented with pairs of pictures differing on a single feature. The children were asked to describe differences between the two pictures and provided with adult aid in the form of verbal prompts. The goal of this mediation strategy was to focus the subjects' attention on a single feature in a visual display.

Step three of the experiment repeated the procedures in step one to obtain a measure of visual analytic ability

subsequent to adult mediation. Means of 18.1 for normal, 10.5 for learning disabled, and 5.7 for retarded children were reported. An analysis of the categorical results indicated that normal children benefited most from adult assistance, learning disabled children moved up to almost the initial independent functioning level of the normals, and mentally retarded children stayed in the bottom two categories.

The second experiment conducted by Tsymbaliuk (cited in Wozniak, 1980) compared the differences among learning disabled and normal children in comprehending the higher-order relationships presented in a picture with a plot. Thirty 8- and 9-year-old learning disabled and a comparable group of normal 7- and 8-year-old subjects were shown a picture of a flock of doves on the roof of a shed with a cat creeping up on the doves, unnoticed. A boy putting up a ladder to drive away the cat was hindered by a flock of goats coming out of the shed. Subjects were instructed to look at the picture and tell what was happening.

Explanations of the picture were rated according to the following four categories:

I. No apparent comprehension of plot with no causal relations mentioned.

II. No real comprehension of plot with one causal relation and a mere listing of objects and actions.

III. Partial comprehension of meaning with two causal relations and poor sequencing of plot.

IV. Adequate comprehension of plot with three causal relations integrated into a unified theme.

In their initial independent performance, the normal subjects' explanations were significantly higher than the learning disabled subjects' explanations with means of 3.3 and 2.3, respectively.

The second step of the experiment consisted of three levels of adult mediation prior to retesting of the original picture. The lowest level of adult assistance presented each character portrayed seperately (e.g., the doves on the roof) for the child to describe. Subjects who did not achieve category IV after the lowest level of assistance were given the middle level of assistance. At this level, children were shown pictures isolating single cause and effect relationships (e.g., cat approaching the doves) followed by another attempt at explaining the plot of the original test picture. Any subject who still did not reach category IV explanations was given the highest level of mediation. Five subpictures that depicted the serial order of events in the main picture were presented for the children to describe.

Tsymbaliuk reported that, with mediation and retesting, all normal subjects reached category IV with either the lowest or middle level of assistance. Only four of the learning disabled students reached category IV with the lowest level of assistance. With the exception of one

student, the middle level of assistance only affected the learning disabled students who had reached category III during initial independent testing. The remaining learning disabled students required the highest level of assistance to reach category IV.

Tsymbaliuk concluded that there was a wide range of individual differences in the zone of proximal development among learning disabled students. Some students made rapid progress with minimal assistance, and others needed a much higher level of adult assistance. Wozniak concluded his presentation of these two Soviet experiments with the statement that this evidence shows "clearly, appropriate educational placement requires assessment techniques which are sensitive to individual differences of this sort, techniques, in other words, which can measure the zone of proximal development" [italics added], (Wozniak, 1980, p. 183).

Western Research Related to the Zone of Proximal Development

Several fundamental changes in the study of children's learning occurred in the past decade, restructuring American learning theory to shift its emphasis to a cognitive-developmental approach (Brown, Bransford, Ferrara, & Campione, 1982). Educational research within the cognitive-developmental paradigm has acknowledged some of the basic principles of Vygotsky's theory. Those included in the research literature were the qualitative

restructuring of the developing child's mental functions, the concept of internalization (i.e., movement from other-regulated to self-regulated mental activity), the role and function of inner speech, and the need for instruction aimed at the zone of proximal development.

Since Vygotsky incorporated these various principles into a unified theory of child development, investigations of any single principle generally included mention of one or more of the others. Metacognitive research which dealt with the concept of internalization presupposed that children engaged in the development of self-regulated strategies were operating within their zones of proximal development (Brown, Campione, & Day, 1981; Palinscar, & Brown, 1983). Investigations of the role of inner speech in students' problem solving activities (Rohrkemper, 1984; Rohrkemper & Bershon, 1984; Wertsch, 1980) also assumed that students were engaged in instructional tasks within their zones of proximal development. Although these assumptions of students operating within their zones seemed valid within the Vygotskian perspective, they remained assumptions. Since no method of assessing students' zones (see Luria, 1961) were employed in these investigations, it was impossible to draw substantially valid conclusions about whether or not students were actually operating within their zones of proximal development.

Rohrkemper and Bershon stated that "teachers can identify students' zones of proximal development through

observation of student performance and by testing" (Rohrkemper & Bershon, 1984, p.145). The question remained, what methods of observation and testing can teachers use to identify students' zones of proximal development for instructional placement in the various subjects taught in the classroom?

Measurement of the Zone of Proximal Development for Reading Placement

Dixon, Stanley, & Powell, (1984a, 1984b) challenged the traditional concept of instructional reading level in their recent research on diagnosis and placement for reading instruction. The instructional reading level developed by Betts (1943) represented a level within a hierarchical continuum of levels of reading processing, generally ranging from preprimer to level 8. The student was placed at one of these levels for the classroom reading program. A developmental reading program consisted of the child's repeated functioning in reading texts at his or her instructional reading level under the conditions of adult guided instruction. The child moved up the hierarchical continuum of levels as her or his instructional reading level became an independent reading level (i.e., the level at which she or he could function without adult aid).

Although movement through this continuum of reading levels was essentially consistent with the Vygotskian principle of movement from an interpsychological to an intrapsychological plane of functioning, Dixon et al.

(1984b) claimed that instructional reading level did not coincide with students' zones of proximal development. According to these authors, all sets of existing criteria for interpreting errors and placement at the instructional reading level produced too low a level of placement because instructional reading level was not measured under the conditions of adult mediation.

Dixon and Powell (1984) developed a contingency framework for mediation to be used in the assessment of students' zones of proximal development. The primary goal of their contingency approach to mediation was the continuous building and restructuring of the learner's self-directing mediating system through social interaction between teacher and student. The rationale for their contingency approach to mediation came from the works of C.S. Peirce, Vygotsky, and Rommetveit.

The philosophy/phenomenology of Peirce (1932) established the meaning of mediation. Peirce presented three degrees of existence (Firstness, Secondness, and Thirdness) which represented a single triadic set of categories in terms of which all phenomena could be classified. A phenomena was classified as a "First", something in itself; a "Second", an existant in dyadic relation to something else; or a "Third", the being that mediates between two other things. A given thing was a Third if its overriding purpose was to mediate a

particular, otherwise non-existant, relationship between two further things.

Dixon and Powell (1984) stated that in a reading context of pedagogical mediation, the teacher acted as a third mediating a relationship between the student and the text. The nature of this relationship was specified by the teacher prior to the mediated situation and contingent upon the specific reading task at hand. In a developmental reading setting, the reading tasks were classified as either diagnostic for assessment of the student's reading ability or instructional for advancement of the student's reading skill.

Brown, Campione, and Day, (1981) investigated mediation of an instructional reading task that dealt with the student's self-assessment of comprehending and remembering textual information (i.e., summarization). For this task, the mediated student-text relationship focused on sorting out trivial information, using superordination rules and using topic sentence rules. Since this mediation was designed for reading instruction of the specific predetermined reading skill of summarization, it would be classified by Dixon and Powell (1984) as an instructional task. In contrast, Dixon and Powell (1984) claimed that reading diagnosis activities required a more global approach to mediation within a social interaction setting.

In their contingency approach to mediation, Dixon and Powell (1984) included the work of Rommetveit (1979) to

help clarify the mediating role of the teacher in a social interaction setting. The teacher, acting as a third, created a relationship between the author of the reading text and the student reader. By selecting and foregrounding a particular topic or perspective, the teacher's dialogue created a temporarily shared social world for the student, text, teacher triad on an interpsychological plane. This author-student relationship that unfolded due to the teacher's mediation during social dialogue was guided by the teacher's external strategic patterns of reasoning through the structure and concepts presented in the text. As Wertsch pointed out, "the strategic patterns of reasoning at the intrapsychological plane will be a direct reflection of the strategy which the child had been encouraged to follow earlier when participating in external social dialogue" (Wertsch, 1980, p. 158).

Dixon, et al. (1984b) conducted two experiments to investigate reading placement at Emergent Reading Levels that were consistent with students' zones of proximal development. The first experiment involved 26 third graders and 26 sixth graders randomly assigned to experimental and control groups. Current or actual developmental reading levels were measured with a Gates-MacGinite Reading Test with average reading achievement reported for all groups as follows: grade

three means were 3.3 for both experimental and control conditions and grade six means were 6.6 for both conditions. All groups were administered a cloze pretest on expository science passages at their actual developmental reading levels, level three or level six. Students in both third and sixth grade experimental groups engaged in a 25 minute mediation session. Mediation consisted of a continuous cycle of adult oral/visual presentation--student feedback--adult oral/visual clarification of the major concepts presented in the respective cloze posttests. Posttests were administered on passages two levels above subjects' actual developmental reading levels (i.e., third graders tested at level five and sixth graders tested at level eight). Dixon, et al. (1984b) reported that students engaged in a mediated testing situation were capable of operating successfully at a higher Emergent Reading Level, two levels upward from instructional reading level.

In a second experiment (Dixon, et al, 1984b), 24 fifth graders in the last month of the school year were given the Gates-MacGinitie Reading Test. A mean actual developmental reading level of 6.4 was reported. Subjects were randomly assigned to experimental and control groups and given a silent narrative Informal Reading Inventory (IRI) at the sixth grade passage level. The experimental group was administered an adult mediated silent IRI at the seventh

and eighth grade passage levels. The control group was administered a nonmediated silent IRI at both seventh and eighth grade passage levels.

The Betts (1943) criteria for determining reading competency levels was applied to the results. The experimental group that engaged in the mediated testing situation had Emergent Reading Levels at the seventh grade passage level with a mean of 94% comprehension and at the eighth grade passage level with a mean of 85% comprehension. The control group was instructional at level seven with a mean of 86% and frustrated at level eight with a mean of 65%. Dixon, et al. (1984b) reported that if the traditional instructional reading level of the IRI were used, students were underplaced at their actual developmental reading level in sixth or seventh grade materials. Using the mediated IRI, students were placed at their Emergent Reading Levels in eighth grade or higher materials.

Dixon et al. (1984b) concluded that students placed at these higher Emergent Reading Levels were operating in their zones of proximal development within the Vygotskian perspective. In both experiments, the authors (a) identified students' current or actual developmental reading levels, and (b) used a contingency framework for mediation in a diagnostic reading situation at higher levels of the diagnostic task. Although the diagnostic

reading task was sequenced upward in text processing difficulty level in the second experiment, students did not reach a frustration or ceiling level of comprehension in the mediated diagnostic situation. In other words, the upper threshold of the students' zones of proximal development was not identified by the authors.

Summary

The most significant aspect of Vygotsky's theory was the manner in which it integrated child development and learning. According to Vygotsky, "learning precedes development and leads it" (Vygotsky, 1962, p.104). He claimed that as the child engaged in a highly challenging learning task within a context of social interaction with the adult teacher, cognitive development unfolded. The strategic patterns of reasoning put forth by the teacher on the plane of external dialogue was internalized by the child. For Vygotsky, this movement from the external social plane to the internal individual plane was the means by which the child came to control and direct her own behavior. In summary, the child's cognitive development took place in an external social interaction context prior to an internal independent functioning context.

Dixon et al. (1984b) claimed that traditional methods of reading diagnosis and placement according to instructional reading level as measured by the Informal Reading Inventory were inconsistent with Vygotsky's

cognitive-developmental approach to learning. According to Dixon et al. (1984a, 1984b) these methods did not recognize the integration of intellectual growth, language growth, and reading growth into an unified theory of cognitive development of the elementary school child.

Dixon et al. (1984b) pointed out that traditional methods of reading diagnosis and placement were based on a theory of reading as the accumulation of reading processing skill along a hierarchical continuum. For these authors, instructional reading level was actually a measure of the child's ceiling level of independent reading functioning or previously accumulated reading skill. It did not offer the teacher an estimate of the child's emerging level of reading functioning that is sensitive to reading skill presently in the process of formation.

Consistent with Vygotsky's theory (Vygotsky, 1962, 1978), Dixon et al. (1984b) suggested that the zone of proximal development for reading encompased the area of sensitivity to reading skill in the process of formation. Emergent Reading Levels represented the levels within the child's zone of proximal development at which reading instruction should be aimed. If teachers are to teach students at the levels consistent with their zones of proximal development, methods must be developed to diagnose students' reading performance for placement at their Emergent Reading Levels.

CHAPTER III
METHODS

Setting of the Study

The study was conducted in an elementary school in north central Florida. The school served kindergarten through fifth grade students who live in a small urban community.

Subjects

The sample in this study was 24 third graders of average to high-average reading ability. Since classrooms for each grade level in the school were grouped by reading levels (i.e., each classroom contains one high, one middle and one low reading group), subjects were drawn from the middle reading groups of two third grade classrooms. Students in the middle reading groups were placed in either their respective grade level basal or one level higher for classroom reading instruction.

Instrumentation

Verbal IQ

The Quick Test (Ammons & Ammons, 1962a) was administered to subjects to obtain a current developmental verbal IQ level for each subject. This test was designed to assess the visual-perceptual recognition of basic

concepts used in language. Ammons and Ammons (1962b) reported reliability estimates of .66 to .95 from several independent studies (N=111), validity estimates of .77 to .95 correlations with the Stanford-Binet and the Wechsler tests, and a 2.45 estimated standard error of raw test scores. Subjects were shown a plate of four black-and-white illustrations and asked to point to the one which represented the word spoken by the examiner. Verbal IQ scores were obtained by the scoring procedures and norms prescribed by the Quick Test provisional manual.

Static Verbal Zone

The Quick Test was used to obtain a static verbal zone for each subject. Static verbal zone scores were the range of items between subjects' first error on the Quick word list and their last correct item before the ceiling level.

Mediated Verbal Zone of Proximal Development

The upper threshold of the verbal zone of proximal development was obtained by adding a mediated condition to the Quick Test for each subject. Mediation began at the subject's first incorrect response. Zone scores were the range of items between subjects' first error on the Quick word list and their last correct mediated response.

The mediated situation consisted of the examiner using the missed word in a sentence context which was consistent with the definition of the word as it was used in the test item (see Ammons & Ammons, 1962b, p. 151). Although the

sentence provided by the examiner was consistent with the definition of the missed word as it was portrayed by the illustration on the plate, the sentence context was not directly related to the illustration.

The rationale for the mediated situation used to tap subjects' zones of proximal development for verbal ability was based on Vygotsky's theory of concept development (Vygotsky, 1962). For Vygotsky, a word represented a concept. According to Vygotsky, students at elementary school age went through a continuous process of restructuring spontaneous, everyday concepts as they were exposed to scientific concepts (i.e., organized bodies of cultural knowledge presented in the school setting). This restructuring of spontaneous concepts occurred as the word became increasingly generalized through instruction and social interaction with adults. Since the subjects' verbal zones represented the areas sensitive to this process of concept restructuring, using the target word in an additional context seemed to be the logical method of tapping subjects' emerging degrees of word generalization.

Static Informal Reading Inventory Pretest

The static Informal Reading Inventory pretest consisted of narrative passages 200 to 300 words long ranging successively from level three to level seven. Readability levels of the passages was assessed using the Schuyler (1982) readability computer program that computes

seven readability formulas. Passage difficulty was assigned according to the visual median of the seven different error ranges of the formulas. Accompanying comprehension questions in the multiple-choice framework (three literal, three inferential, three vocabulary and one evaluative) were developed by the experimenter.

Comprehension error ranges for determining instructional reading levels were evaluated using the Powell (1970) criteria of 60% to 85% accuracy for levels three to five and 65% to 90% for levels six and seven. This static IRI yielded a pretest score for each subject.

Static Informal Reading Inventory Posttest

Construction of the static Informal Reading Inventory posttest replicated exactly the procedure used to construct the static Informal Reading Inventory pretest. There were two passages at each level, levels four through seven, and both passages also had accompanying comprehension questions. The two passages came from a continuous narrative at each level similar to a typical basal reader narrative selection.

Comprehension error ranges for these passages complied to the Powell (1970) criteria of 60% to 85% for levels three through five and 65% to 90% for levels six and seven. These ranges represented instructional reading levels using the traditional static Informal Reading Inventory. This static Informal Reading Inventory yielded posttest scores for each subject in the control group.

Mediated Informal Reading Inventory Posttest

Construction of the mediated Informal Reading Inventory replicated exactly the procedure used to construct the static Informal Reading Inventory posttest as explained in the section above. There were two passages at each level, levels four through seven, and both passages also had accompanying comprehension questions. The two passages in a continuous narrative at each level were similar to two silent reading units of a typical basal reading lesson.

Comprehension error ranges for the mediated Informal Reading Inventory were adjusted ten percentage points, 50% to 85% for levels four and five and 55% to 90% for levels six and seven. This adjustment of comprehension accuracy was made to accommodate students' functioning on a mediated Informal Reading Inventory at their Emergent Reading Levels within their zones of proximal development.

The rationale for a 10% lower comprehension accuracy criteria was based on the Emergent Reading Levels experiment of Dixon, et al. (1984b). In this study, students at or below frustration level on the traditional static Informal Reading Inventory (below 65%) scored at instructional reading level (above 65%) on the mediated Informal Reading Inventory. Although students scored higher on the mediated Informal Reading Inventory, the upper threshold of their Emergent Reading Levels was not

identified. The focus of the present investigation was on reaffirming the existence of Emergent Reading Levels and establishing comprehension error criteria for identifying these levels within students' zones of proximal development. Lowering the criteria by 10% accuracy helped to establish the upper threshold of students' zones of proximal development for reading (see Vygotsky, 1978). The mediated Informal Reading Inventory yielded posttest scores for each subject in the experimental group.

Experimental Design and Data Collection

A randomized block analysis of covariance design was used. Subjects were matched on static verbal IQ scores of the Quick Test and randomly assigned to a control or experimental group to control for individual verbal IQ differences between groups prior to experimental treatment. Although the verbal zone scores were collected during the initial individual testing session of the Quick Test, they were not used for the matching procedure.

Informal Reading Inventory Pretest

The static Informal Reading Inventory was administered as a pretest in both experimental and control group settings. Subjects read the passages silently, followed by the experimenter reading the questions orally to the group. Subjects marked their answers on individual answer sheets as the experimenter read the four multiple choice answers to them.

Treatment and Informal Reading Inventory Posttest

The experimental group was engaged in a mediated situation prior to posttesting. The mediated situation began at the two passages at level four.

Mediation was conducted by the experimenter within a contingency framework (Powell & Dixon, 1984). The experimenter acted as a Third (see p. 32) mediating a relationship between the experimental subjects and the textual story. This relationship unfolded through the spontaneous external social dialogue between the experimenter and the experimental subjects.

For the first passage at each level, the experimenter provided background on the story schema topics or perspectives of interest (i.e., the story setting, problem, and goal) through social dialogue with the experimental group. No vocabulary pertinent to the first passage was explicitly taught to the group. Following this initial story schema mediation, the group read the first passage silently, the experimenter read the comprehension questions to the group, and the group then marked their answer choices on their individual answer sheets.

For the second passage at each level, the experimenter selected and provided background on the next story schema topics or perspectives of interest (i.e., restatement of the goal, attempts to achieve the goal) and conducted direct instruction of pertinent vocabulary in the upcoming passage. This background and vocabulary development was

also conducted in an external social dialogue context. Following this second mediation session, experimental subjects read the second narrative passage silently, the experimenter read the comprehension questions to the group, and they marked the answers they choose on individual answer sheets.

The experimental group continued this two step mediation procedure with the two Informal Reading Inventory passages at levels five, six, and seven. Subjects in the control group received the same passages at levels four, five, six, and seven with no mediated situation prior to reading. Following the control groups' silent reading of each passage, the experimenter read the comprehension questions to the group orally, and subjects marked their answer choices on individual answer sheets.

Data Analysis

The data collected in this experiment was interpreted at the reading functioning level and at the statistical analysis level. The reading functioning level included determining subjects' instructional, independent, and frustration reading levels from their comprehension scores on the static Informal Reading Inventory pretest. It also included an interpretation of experimental subjects' Emergent Reading Levels (i.e., reading levels within their zones of proximal development) according to their performance on the mediated Informal Reading Inventory posttest.

The statistical analysis included a series of analysis of covariance regression procedures to test Hypotheses I, II, III, V, and VI. The Informal Reading Inventory posttest was used as the dependent variable with the mediated or nonmediated groups as the treatment variable. The static Informal Reading Inventory pretest was the covariate. The relationship between verbal zone scores as measured by the mediated Quick Test and Emergent Reading Levels was analyzed using the verbal zone partial regression coefficients. All possible interactions between the various independent variables (i.e., static Informal Reading Inventory pretest, verbal IQ, treatment groups, and verbal zone scores) were analyzed initially to meet the assumption of equal slopes.

The statistical analysis also included a dependent sample t test and Pearson-Product-Moment correlations. The t test was used to determine the difference between subjects' static nonmediated verbal zone scores and their mediated verbal zone scores for Hypothesis IV. The Pearson-Product-Moment correlational trends of the data were also interpreted.

CHAPTER IV
ANALYSIS OF THE DATA

This study was conducted to investigate the application of the zone of proximal development to reading diagnosis and placement. Verbal IQ, verbal zone of proximal development, static Informal Reading Inventory, and dynamic Informal Reading Inventory measures for each third grade subject were obtained by the researcher.

The data were analyzed at the statistical analysis level using Pearson-product-moment correlations and a series of multiple regression analyses, available from the packaged Statistical Analysis System (SAS). The multiple regression analysis series consisted of a test of two regression models, using the Type III Sum of Squares, for each Informal Reading Inventory posttest at passage levels four, five, six, and seven. The first regression model was a test of the possible independent variable interactions to meet the multiple regression analysis assumption of equal slopes. The second model was a test of the multiple regression model with the various interaction terms deleted.

The data were also analyzed at the reading functioning level. A discussion of the five major questions addressed by this study is included in this analysis.

Results at the Statistical Analysis Level

Descriptive Statistics

Analysis of the raw data (see APPENDIX A) showed traditional or static verbal IQ scores (reported as mental age) of 8.5 to 14.0 with a range of 5.5. The experimental group mean was 11.1 with a standard deviation of 1.61, and the control group mean was 10.8 with a standard deviation of 1.63. Since groups were formed on paired blocks of verbal IQ scores, the experimental and control group means on this variable were similar, as expected.

Verbal zone scores (reported as width of verbal zone) of 13 to 36 with a range of 23 were reported for the sample. The experimental group mean was 25.08 with a standard deviation of 6.00, and the control group mean was 23.66 with a standard deviation of 3.86.

Results of the Hypotheses Tests

Preliminary tests of the interactions between all independent variables of each hypothesis were conducted. All hypotheses were tested at the .05 level of significance.

Hypothesis 1: There is no difference between Emergent Reading Levels as measured by a mediated Informal Reading Inventory that focuses on both story schema and vocabulary development and instructional reading level as measured by a traditional static Informal Reading Inventory.

A series of four separate multiple regression analyses at level four, level five, level six, and level seven were used to test this hypothesis. At each level, the posttest Informal Reading Inventory that focused on story schema plus vocabulary development was the dependent variable with the respective pretest, verbal IQ, verbal zone, and treatment group as the independent variables. As shown in Table 1, the multiple Rs at level four, level five level six, and level seven, were .47, .46, .63, and .41, respectively, (significant at the .05 level).

The multiple regression analysis also provided measurement of the strength of the relationship of the dependent variable, story schema plus vocabulary development mediated or nonmediated Informal Reading Inventory posttest, and a single independent variable, either the respective pretest, verbal IQ, zone, or treatment group, while controlling for all of the other independent variables in the model. In a test of the regression coefficients for each of the independent variables (see Table 2), the statistic of interest for Hypothesis I was the story schema plus vocabulary development mediated or nonmediated treatment coefficient at each level, 4 through 7, of the posttest. Results of the test of the treatment coefficient were all significant at the .05 level, $F\ (1,19) = 8.93$, $p<.007$, at level four,

Table 1.

Multiple Regression Summaries of Story Schema Plus Vocabulary Development Informal Reading Inventory

Source	df	SS	MS	F	R
Level 4					
Model	4	5088.35	1272.08	4.26*	.47
Error	19	5674.14	298.63		
Level 5					
Model	4	6244.28	1561.07	4.07*	.46
Error	19	7289.04	383.63		
Level 6					
Model	4	8066.27	2016.56	8.28*	.63
Error	19	4629.55	243.66		
Level 7					
Model	4	3884.55	971.13	3.44*	.41
Error	19	5365.44	282.39		

* $p < .05$

Table 2.

Summaries of Independent Variable Regression Coefficients for Story Schema Plus Vocabulary Development Informal Reading Inventory

Source	df	SS	F
Level 4			
IQ	1	125.44	.42
Zone	1	1040.16	3.84
Pretest	1	.19	.00
Treatment	1	2668.32	8.93*
Level 5			
IQ	1	16.32	.04
Zone	1	214.46	.56
Pretest	1	1943.99	5.07*
Treatment	1	2722.47	7.10*
Level 6			
IQ	1	171.42	.70
Zone	1	67.64	.28
Pretest	1	93.50	.38
Treatment	1	7566.35	31.05*
Level 7			
IQ	1	.39	.00
Zone	1	220.48	.78
Pretest	1	839.48	2.97
Treatment	1	2565.13	9.08*

* $p < .05$

F (1,19) = 7.10, $p<.01$, at level five, F (1,19) = 31.05, $p<.001$, at level six, and F (1,19) = 9.08, $p<.007$, at level seven. A reliable increase was reported for the story schema plus vocabulary development mediated Informal Reading Inventory posttests over the static nonmediated Informal Reading Inventory posttests.

The null Hypothesis I was rejected. As shown in Table 3, the adjusted means for the story schema plus vocabulary development mediated group at each level of the Informal Reading Inventory posttest were significantly higher than the adjusted means of the nonmediated group. When mediation focused on both story schema and vocabulary development, Emergent Reading Levels were higher than the nonmediated instructional reading level.

Hypothesis II: There is no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on story schema development, and instructional reading level measured by the traditional static Informal Reading Inventory.

A series of four separate multiple regression analyses at level four, level five, level six, and level seven were used to test hypothesis II. At each level, the posttest Informal Reading Inventory that focused only on story schema development was the dependent variable with the respective pretest, verbal IQ, verbal zone, and treatment

Table 3.

Adjusted Means for Story Schema Plus Vocabulary Development Informal Reading Inventory Posttests

Treatment	Posttest Passages							
	Level 4		Level 5		Level 6		Level 7	
	Means	SE	Means	SE	Means	SE	Means	SE
Mediated	65.36	5.24	67.61	5.73	58.67	4.75	83.05	4.90
Nonmediated	42.13		45.72		22.15		61.94	
X1 = X2	$p < .0075$		$p < .0153$		$p < .0001$		$p < .0071$	

group as the independent variables. As shown in Table 4, the multiple Rs for the story schema development mediated Informal Reading Inventory at levels four through seven were .18, .34, .09, and .64, respectively. Only the multiple R at level seven was significant at the .05 level.

The multiple regression analysis also provided a measurement of the strength of the relationship of the dependent variable, story schema development mediated posttest Informal Reading Inventory, and a single independent variable, either the respective pretest, verbal IQ, zone, or treatment group, while controlling for all of the other variables in the model. In a test of the regression coefficients for each of the independent variables (see Table 5), the statistic of interest for Hypothesis II was the story schema development mediated or nonmediated treatment coefficient at each level, four through seven, of the posttest. Results of the test of the treatment coefficients showed no reliable increase for the story schema development mediated group over the nonmediated group, F (1, 19) = 1.08, $p<.31$, at level four, F (1, 19) = 1.80, $p<.19$, at level five, and F (1, 19) = .14, $p<.71$, at level six (not significant at the .05 level).

The null Hypothesis II was not rejected. As shown in Table 6, the adjusted means for the story schema

Table 4.

Multiple Regression Summaries of Story Schema Development Informal Reading Inventory

Source	df	SS	MS	F	R
Level 4					
Model	4	1406.99	351.74	1.06	.18
Error	19	6326.33	332.96		
Level 5					
Model	4	4508.64	1127.16	2.48	.34
Error	19	8624.68	453.93		
Level 6					
Model	4	545.47	136.36	.51	.09
Error	19	5050.35	265.80		
Level 7					
Model	4	1760.86	293.47	5.13*	.64
Error	19	972.46	57.20		

* $p < .05$

Table 5.

Summaries of Independent Variable Regression Coefficients For Story Schema Development Informal Reading Inventory

Source	df	SS	F
Level 4			
IQ	1	287.83	.86
Zone	1	19.71	.06
Pretest	1	120.22	.36
Treatment	1	361.23	1.08
Level 5			
IQ	1	105.04	.23
Zone	1	4.76	.01
Pretest	1	2409.86	5.31*
Treatment	1	816.08	1.80
Level 6			
IQ	1	56.90	.21
Zone	1	6.17	.02
Pretest	1	215.05	.81
Treatment	1	37.05	.14
Level 7			
IQ	1	112.77	1.97
Zone	1	18.47	.32
Pretest	1	196.22	3.43
Treatment	1	365.06	6.38*
Pretest X Treatment	1	470.91	8.23*

* $p < .05$

Table 6.
Adjusted Means for Story Schema Development Informal Reading Inventory Posttests

Treatment	Posttest Passages							
	Level 4		Level 5		Level 6		Level 7	
	Means	SE	Means	SE	Means	SE	Means	SE
Mediated	57.60	5.54	64.32	6.23	56.19	4.77	54.83	2.57
Nonmediated	49.06		52.34		54.13		58.49	
X1 = X2	$p < .3107$		$p < .1958$		$p < .7130$		$p < .3325$	

development mediated group at levels four, five, and six of the posttest were not significantly higher than the adjusted means of the nonmediated group. When mediation focused only on story schema at levels four to six, Emergent Reading Levels were not significantly higher than the nonmediated instructional reading level.

The story schema development mediated or nonmediated treatment coefficient at level seven posttest, F (1, 17) = 6.38, $p<.02$, was not interpretable due to the pretest X treatment interaction, F (1, 17) = 8.23, $p<.01$. The level seven posttest mean of 54.83 for the story schema development mediated group was lower than the mean of 58.49 for the nonmediated group, as expected with the treatment X pretest interaction. Mediation of only story schema at level seven had an adverse affect on student performance (i.e., students in the mediated group scored higher on the nonmediated pretest than they did on the story schema mediated posttest). Since this treatment X pretest interaction did not occur at any other level of the story schema development mediated Informal Reading Inventory posttest, it was probably due to chance factors.

Hypothesis III: There is no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on vocabulary development, Emergent Reading Levels measured by a mediated Informal Reading Inventory

that focuses on story schema plus vocabulary development, and Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses only on a story schema approach.

The scores obtained at levels four, five, six, and seven, of the Informal Reading Inventory posttests were converted to standard scores, combined across all four Informal Reading Inventory passage levels (four through seven), and weighted by four. This procedure resulted in a single score for each subject that reflected his or her total performance on the four Informal Reading Inventory posttest passages combined. These total performance scores were used to form the following three composites: (a) composite I was the weighted sum of the standard posttest scores at levels four to seven, collected following the story schema development mediated or nonmediated treatment; (b) composite II was the weighted sum of the standard posttest scores at levels four to seven, collected following the story schema plus vocabulary development mediated or nonmediated treatment; and (c) composite III was the difference between composite II, story schema plus vocabulary development, and composite I, only story schema development. In summary, manipulation of standardized posttest scores provided a story schema dependent variable in composite I, a story schema plus vocabulary development dependent variable in composite II, and a vocabulary development dependent variable in composite III.

Three separate multiple regression analyses were used to test Hypothesis III. The three composites were used as dependent variables with verbal IQ, verbal zone, and treatment groups as the independent variables. As shown in Table 7, the multiple R for story schema was .19, for composite I (not significant at the .05 level), the multiple R for vocabulary was .46, for composite III (significant at the .05 level), and the multiple R for story shema and vocabulary development was .58, for composite II (significant at the .05 level).

In a test of the independent variable regression coefficients for each composite dependent variable, the statistic of interest for Hypothesis III was the story schema development, vocabulary development, or story schema plus vocabulary development mediated or nonmediated treatment coefficient. Results of the test of the story schema only treatment coefficient were, F (1, 20) = .80, $p<.38$, for composite I (not significant at the .05 level). Accross all levels, four through seven, of the Informal Reading Inventory, no reliable difference was reported between the static nonmediated group and the story schema development mediated group.

The results of the story schema with vocabulary development treatment coefficient were, F (1, 20) = 9.48, $p<.0001$, for composite II (significant at the .05 level). A reliable increase in performance on the Informal Reading

Table 7.

Standard Score Multiple Regression Summaries of Story Schema Development, Vocabulry Development, and Story Schema Plus Vocabulary Development Informal Reading Inventories

Source	df	SS	MS	F	R
Story Schema (Composite I)					
Model	3	2.51	.83	1.63	.19
Error	20	10.27	.51		
Vocabulary (Composite III)					
Model	3	4.72	1.57	5.72*	.46
Error	20	5.49	.27		
Story Schema & Vocabulary (Composite II)					
Model	3	8.49	2.83	9.48*	.58
Error	20	5.97	.29		

* $p < .05$

Inventory Posttest was reported for the story schema plus vocabulary development mediated group over the nonmediated group. The adjusted standard score mean for the story schema with vocabulary development mediated group was .56, and the adjusted mean for the nonmediated group was -.57.

Results of the vocabulary development only treatment coefficient were, F (1, 20) = 5.72, $p<.0054$, for composite III (significant at the .05 levels). Across all levels of the Informal Reading Inventory posttest, levels four through seven, a reliable difference was reported between the vocabulary development mediated group and the nonmediated group. The adjusted Informal Reading Inventory posttest mean for the vocabulary development only mediated group was .43, and the adjusted mean for the nonmediated group was -.44.

The null Hypothesis III was rejected. When mediation focused on story schema only across all levels, four to seven of the Informal Reading postest (Composite I), Emergent Reading Levels were not significantly higher than the nonmediated instructional reading level. However, when mediation focused on story schema with vocabulary development (Composite II) or on vocabulary development only (Composite III) across all levels of the posttest, Emergent Reading Levels were significantly higher than nonmediated instructional reading level.

Hypothesis IV: There is no difference between verbal zones measured by the static Quick Test

and mediated verbal zones measured by a mediated dynamic Quick Test.

A dependent samples t test was used to test this hypothesis. The static nonmediated zone score was a measure of the range of items between each subject's first error on the Quick word list and the last correct response before the ceiling item. The mediated verbal zone score was a measure of the range of items between each subject's first error on the Quick word list and the last correct mediated response. The Pearson-product-moment correlation between the nonmediated static verbal zone and the mediated dynamic verbal zone was .58, $p<.0026$.

The mean for the nonmediated static verbal zone was 12.75 items, and the mean for the mediated dynamic verbal zone was 24.37 items. There was a significant difference between subjects' static nonmediated verbal zones and dynamic mediated verbal zones t (22) = 13.92, p =.0001.

The null Hypothesis IV was rejected. Students visual-perceptual recognition of basic concepts used in language increased significantly when the concept was mediated by an adult using the sentence context approach.

Hypothesis V: There is no relationship between mediated verbal zone scores measured by the mediated Quick Test, and the Emergent Reading Levels measured by a mediated Informal Reading Inventory which focuses on story schema plus vocabulary development.

A series of four separate multiple regression analyses at level four, five, six, and seven were used to test this hypothesis. At each level, the story schema plus vocabulary development mediated or nonmediated Informal Reading Inventory posttest was used as the dependent variable. The respective pretest, verbal IQ, verbal zone, and story schema plus vocabulary development mediated or nonmediated treatment groups were the independent variables used.

The multiple regression analysis provided measurement of the strength of the relationship of the dependent variable, story schema plus vocabulary development mediated or nonmediated Informal Reading Inventory posttest, and the independent variable, verbal zone, while controlling for all other independent variables in the model. In a test of the regression coefficients for each of the independent variables (see Table 2), the statistic of interest for Hypothesis V was the verbal zone coefficient.

Results of the test of the verbal zone coefficient were, $\underline{F}$ (1,19) = 3.48, $\underline{p}$ <.07, at level four, $\underline{F}$ (1,19) =.56, $\underline{p}$ <.46, at level five, $\underline{F}$ (1,19) = .28, $\underline{p}$ <.60, at level six, and $\underline{F}$ (1,19) = .78, $\underline{p}$ <.38, at level seven. None of the tests of the verbal zone coefficients were significant at the .05 level.

The null Hypothesis V was not rejected. At every level of the posttest, four to seven, the verbal zone

coefficient added nothing to variation in the posttest Informal Reading Inventory explained by the story schema plus vocabulary development mediation treatment coefficient. There was no relationship between the verbal zone scores and Emergent Reading Levels.

Hypothesis VI: There is no relationship between verbal zone scores measured by the mediated Quick Test, and the Emergent Reading Levels measured by a mediated Informal Reading Inventory that focuses on story schema.

A series of four separate multiple regression analysis at levels four, five, six, and seven were used to test this hypothesis. At each level, four to seven, the story schema development mediated Informal Reading Inventory posttest was used as the dependent variable. The independent variables were the respective pretest, verbal IQ, verbal zone, and story schema mediated treatment. As shown in Table 4, the only multiple R which was significant at the .05 level was .64 at level seven which accounted for about 41% of the story schema development mediated Informal Reading Inventory posttest variance.

Measurement of the strength of the relationship of the story schema Informal Reading Inventory posttest dependent variable and the verbal zone independent variable, while controlling for all other variables in the model, was provided by the multiple regression analysis procedure (see

Table 5). The statistic of interest to Hypothesis VI was the verbal zone partial regression coefficient.

Results of the test of the verbal zone partial regression coefficient were, F (1,19) = .06, p <.81, for level four, F (1,19) = .01, p <.91, for level five, F (1,19) =.02, p <.88, for level six. None of the tests of the verbal zone partial regression coefficients for the story schema development mediated Informal Reading Inventory posttest reached the .05 level of significance. The verbal zone partial regression coefficient was uninterpretable at level seven due to the interaction between the pretest X treatment variable.

The null Hypothesis VI was not rejected. There was no relationship between the verbal zone scores and the Emergent Reading Levels which focused on story schema development mediation.

Intercorrelational Statistics

The Pearson-product-moment intercorrelations between the covariates (see Table 8) were low. It was resonable to expect a medium to high relationship between the Informal Reading Inventory pretest that measures reading comprehension and the Quick Test that measures verbal IQ. Correlations between IQ and reading comprehension generally are in the .40s and .50s in the first grade (Bond & Dykstra, 1967) and rise to the .70s by the seventh grade (Allen, 1944). The only significant relationship between

these two variables was reported at level 6 pretest with a coefficient of .41, and a p value of .04.

It was also reasonable to expect medium to high relationships between the Informal Reading Inventory pretests at levels three to seven. Although all of the pretests were measures of reading comprehension, only two significant intercorrelations occurred. The correlation between level four and level seven pretests had a coefficient of .43, with a p value of .03, and the correlation between level five and level six pretests had a coefficient of .43, with a p value of .03.

The overall trend of low intercorrelations between verbal IQ, verbal zone, and Informal Reading Inventory Pretests could have been due to a reduction in the variability of the sample used in this study. This was a fairly homogeneous sample of third grade average to high-average readers.

Pearson-product-moment intercorrelations between the verbal IQ, static verbal zone, and mediated verbal zone were computed. The static verbal IQ was a measure of subjects' independent or nonmediated visual-perceptual recognition of basic concepts used in language. The static zone was a measure of the subjects' independent or nonmediated ranges of acceptable language functioning (i.e., from the first error to the last correct nonmediated response before their ceiling levels were reached). The

Table 8. Covariate Correlation Matrix

Covariates	IQ	Zone	P3	P4	P5	P6	P7
IQ	1.00	-.27	-.34	.29	.32	.41*	.27
Zone		1.00	.11	.12	-.21	.01	.27
P3			1.00	.28	.28	.17	.07
P4				1.00	.12	-.05	.43*
P5					1.00	.43*	-.03
P6						1.00	.14
P7							1.00

* $p < .05$

mediated verbal zone was a measure of the subjects' mediated ranges of acceptable language functioning (i.e., from the first error to the last correct mediated response before their ceiling levels were reached).

The correlation coefficient of the static and mediated zones was .58, significant at the .05 level. It was reasonable to expect a medium to high relationship between these two variables because they both measure a range of acceptable language functioning. The correlation coefficient of the static verbal zone and IQ was .35, and the correlation coefficient of the mediated verbal zone and IQ was -.27 (both not significant at the .05 level).

The Pearson-product-moment intercorrelations between the treatment variable and the level four to level seven posttest scores are shown in Table 9 and Table 10. Three distinct trends were revealed in the intercorrelational analysis. First, there was no significant relationship between the first posttests administered at each level, four through seven, and the story schema mediation treatment (see Table 9).

The second trend was the significant relationships reported between all of the second posttests administered at each level, four through seven, and the story schema plus vocabulary development mediation treatment (see Table 10). The correlation coefficients for the treatment group variable and the posttests were .60 with p value of .0016

Table 9.

Posttest and Story Schema Treatment Correlation Matrix

Posttests & Treatment	Level 4	Level 5	Level 6	Level 7	Treatment
Level 4	1.00	.39	.29	.53*	-.32
Level 5		1.00	.59*	.31	-.32
Level 6			1.00	.31	-.13
Level 7				1.00	.07
Treatment					1.00

* $p < .05$

Table 10.

Posttest and Story Schema Plus Vocabulary Development Treatmen Correlation Matrix

Posttests & Treatment	Level 4	Level 5	Level 6	Level 7	Treatment
Level 4	1.00	.44*	.54*	.39	-.60*
Level 5		1.00	.62*	.50*	-.49*
Level 6			1.00	.67*	-.77*
Level 7				1.00	-.55*
Treatment					1.00

* $p < .05$

at level 4, .49 with p value of .01 at level 5, .77 with p value of .0001 at level six, and .55 with p value of .0052 at level seven.

The final important correlational trend in the treatment and posttest matrix (see Table 10) was the significant relationships reported between the second posttests at levels four through seven. The correlation coefficients were .44 for level four with level five, .54 for level four with level six, .62 for level five with level six, .50 for level five with level seven, and .67 for level six with level seven (all significant at the .05 level).

Discussion

The global purpose of this study was to investigate Vygotsky's concept of the zone of proximal development as it applies to reading diagnosis and placement. The following questions were addressed in this investigation:

1. Was a dynamic testing model effective in exposinging students' zones of proximal development for reading functioning?

2. Was there a comprehension error range established to interpret Emergent Reading Levels?

3. What type of mediation was most effective in exposing students' Emergent Reading Levels?

4. Was a mediated verbal zone of proximal development above the static zone exposed?

5. What was the relationship between the mediated verbal zone and Emergent Reading Levels?

Results of the statistical analysis and the reading functioning analysis were interpreted to answer these five questions. The Powell differentiated criteria for comprehension error ranges was used to interpret the static Informal Reading Inventory measures, and the researcher's adjusted criteria for comprehension error ranges was used with the mediated Informal Reading Inventory measures (see Chapter III of this manuscript for a complete discussion of the Informal Reading Inventory error range criteria).

Question 1: Was a dynamic testing model effective in exposing students' zones of proximal development for reading functioning?

The construct Emergent Reading Levels (Dixon et al., 1984b, Powell, 1984) was reaffirmed as a zone of mediated reading functioning beyond the traditional instructional reading level introduced by Betts (1943). Subjects' instructional reading levels measured with a static Informal Reading Inventory (IRI) pretest were level three, with frustration at levels four and above.

Mean IRI posttest comprehension scores for the mediated experimental group and the nonmediated control group were reported in Table 11. The experimental group, operating in a mediated IRI posttest had Emergent Reading Levels at levels four through seven, and the control group

operating in a static IRI posttest had frustration at levels four through seven.

The predicted IRI posttest scores for individual subjects in the mediated and nonmediated groups (see Table 12) further confirmed the existence of Emergent Reading Levels. With the exception of one subject at level four and one subject at level six, the mediated group functioned above frustration. At every passage level of the IRI posttest, the nonmediated group had all or at least half of the subjects functioning at frustration.

Question 2: Was there a comprehension error range established to interpret Emergent Reading Levels?

The 10 percentage point adjustment of the Powell (1970) criteria of 60% to 50% accuracy at levels four and five and 65% to 55% at levels six and seven established the comprehension error range criteria. Based on the previous study (Dixon et al., 1984b), this adjustment did help to establish the upper threshold of students' zones of proximal development (see Vygotsky, 1978) for reading placement.

Interpretation of the individual predicted scores of the mediated group showed that at passage level six, 11 subjects (n=12) did not reach the old criteria of 65% to 90%. Only one subject (n=12) did not reach the adjusted criteria of 55% to 90% accuracy. Without the adjustment,

Table 11.

Informal Reading Inventory Posttest Mean Comprehension Scores for Story Schema Plus Vocabulary Development Mediated and Nonmediated Groups

Condition	Level 4	Level 5	Level 6	Level 7
Mediated	65.36**	67.61**	58.67**	83.05**
Nonmediated	42.13*	45.72*	22.15*	61.94*

**Emergent Reading Levels

*Frustration Reading Level

Table 12.

Summary of Reading Levels Based on Individual Predicted Scores of Story Schema Plus Vocabulary Development Mediated and Nonmediated Informal Reading Inventories

Informal Reading Inventory Passage Levels									
Mediated Levels					Nonmediated Levels				
	4	5	6	7		4	5	6	7
Emergent	11	12	11	10	Instructional	0	3	0	6
Independent	0	0	0	2	Independent	0	0	0	0
Frustration	1	0	1	0	Frustration	12	9	12	6
Total	12	12	12	12	Total	12	12	12	12

level six was frustration and level five was the upper threshold of the zones. However, at level seven, all 12 mediated subjects reached the old criteria of 65% to 90%.

In summary, the 10 percentage point adjustment was established. If this adjustment had not been made, the upper threshold of students' zones of proximal development would have been underestimated by two levels (i.e., from level seven to level five). This finding was consistent with Vygotsky's theory that the zone of proximal development required mediated functioning on a highly difficult task (Vygotsky, 1978). Lowering the comprehension criteria enabled subjects in the mediated group to progress up the IRI passages to a highly difficult passage level.

Question 3: What type of mediation was most effective in exposing students' Emergent Reading Levels?

This study compared a static IRI testing model with a dynamic mediated IRI testing model. Luria (1961) suggested comparing students' independent performance with direct adult mediated performance to investigate students' zones of proximal development. In the reading context of this study, the static IRI was a measure of students' independent reading performance, and the mediated IRI was a measure of students' direct adult mediated reading performance. Following Vygotsky's theory for investigation

of the zone of proximal development (Luria, 1961; Vygotsky, 1962, 1978), this type of comparison was designed to analyze students' ability to benefit from reading mediation.

The types of mediation investigated were story schema, vocabulary development, and story schema plus vocabulary development. At each IRI passage level, four through seven, the story schema mediation was ineffective (see Hypothesis II), and the story schema plus vocabulary development mediation was effective (see Hypothesis I). Across all IRI passage levels combined, four through seven, story schema mediation was ineffective, vocabulary development mediation was effective, and story schema with vocabulary development was the most effective type of adult mediation used to diagnose subjects' Emergent Reading Levels (see Hypothesis III).

Question 4: Was a mediated verbal zone of proximal development above the static zone exposed?

The static verbal zone and the mediated verbal zone used in this study were both measures of subjects' ranges of acceptable language functioning, before language frustration occurred. The high correlation between static verbal zone and mediated verbal zone was expected. Both of these zones were considered a range of "imperfect or incomplete language knowledge" because not all of the basic

concepts within these areas were correctly identified by the subjects.

As shown in the t test statistical analysis (see Hypothesis IV), the mediated zone was significantly higher than the static zone. The sentence context mediation increased the subject's range of acceptable language functioning. The low correlations between IQ and both the static and mediated verbal zones were also expected. The verbal zones were measures that contained unidentified basic language concepts, whereas the verbal IQ was a measure of identified basic language concepts.

For Vygotsky, language was the means of social interaction (Vygotsky, 1981) as well as the medium for translating socially elaborated meanings (Leont'ev, 1981). In this study, the upper threshold of the range of unidentified basic language concepts, within subjects' acceptable language functioning, increased significantly when those unidentified concepts were put in a sentence context (see Hypothesis IV). The sentence context was designed to diagnose subjects' functioning in the common verbal medium used between adult and child when socially elaborated meanings or basic language concepts are translated or taught.

Question 5: What was the relationship between the mediated verbal zone and Emergent Reading Levels?

A significant relationship between subjects' dynamic mediated verbal zones and Emergent Reading Levels using both the story schema only and the story schema plus vocabulary development mediation was not found in this study (see Hypothesis V and Hypothesis VI). This finding helped to clarify the importance of social interaction in the mediated situation used to tap the zone of proximal development (Vygotsky, 1962, 1978).

The sentence context of the dynamic verbal zone was used to diagnose subjects' functioning in the common medium, verbal language, that is used in adult-to-child transmitting of word meanings. Diagnosis of the mediated verbal zone in a sentence context lacked the element of verbal interaction with an adult. Assessment of the mediated verbal zone in this study was not a means of diagnosing subjects' direct adult mediated performance.

In contrast, the diagnosis of Emergent Reading Levels did include subjects' functioning in a mediated situation that contained verbal interaction with an adult during engagement in a highly challenging reading task. Assessment of Emergent Reading Levels in this study was a means of diagnosing subjects' direct adult mediated performance.

In summary, a significant relationship between the mediated verbal zone used in this study and Emergent Reading Levels was not expected. The mediated verbal zone

was a measure of subjects' independent functioning in a language context and Emergent Reading Levels were measures of the subjects' mediated functioning in a situation that included verbal interaction with an adult.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study investigated L. S. Vygotsky's concept of the zone of proximal development as it applies to reading diagnosis and placement. The following questions were asked:

1. Was a dynamic testing model effective in exposing students' zones of proximal development for reading functioning?
2. Was there a comprehension error range established to interpret Emergent Reading Levels?
3. What type of mediation was most effective in exposing students' Emergent Reading Levels?
4. Was a mediated verbal zone of proximal development above the traditional static zone exposed?
5. What was the relationship between the mediated verbal zone and Emergent Reading Levels?

The study sample consisted of 24 third grade students of average to high-average reading achievement. Subjects were drawn from the middle reading groups of two third grade classrooms in Alachua County, Florida.

A randomized block analysis of covariance design was used. Subjects were matched on static Verbal IQ scores of the Quick Test and randomly assigned to a control or

experimental group. All subjects were tested with the static and mediated Quick Test and a static silent Informal Reading Inventory (IRI) pretest by the researcher.

All subjects were tested by the researcher with two silent IRI posttests, constructed from a continuous narrative at passage levels four, five, six, and seven. The experimental group was engaged in mediated situations prior to the two posttests at each passage level, four through seven. The first mediated situation at each passage level was a story schema development approach, and the second mediated situation was a story schema plus vocabulary development approach. The control group did not engage in a mediated situation prior to posttesting.

Six hypotheses were tested at the .05 level of significance in this study.

1. Hypothesis I stated that there would be no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focused on both story schema and vocabulary development and instructional reading level measured by a traditional static Informal Reading Inventory.

Four multiple regression analyses at passage levels four, five, six, and seven were used to test for differences between story schema plus vocabulary development mediated Emergent Reading Levels and

nonmediated instructional reading level. Since the test of the treatment coefficients at each passage level, four through seven, indicated that differences did occur, Hypothesis I was rejected. Subjects engaged in the story schema and vocabulary development mediation scored significantly higher on the Informal Reading Inventory postests than subjects that were administered a nonmediated static Informal Reading Posttest.

2. Hypothesis II stated that there would be no difference between Emergent Reading Levels measured by a mediated Informal Reading Inventory that focused on story schema development and instructional reading level as measured by a traditional static Informal Reading Inventory.

Four multiple regression analyses at passage levels four, five, six, and seven were used to test for differences between story schema mediated Emergent Reading Levels and nonmediated instructional reading levels. Results of the treatment coefficients at each passage level, four through seven, indicated that differences did not occur. Hypothesis II was not rejected. When mediation focused only on story schema development, Emergent Reading Levels and instructional reading level were the same.

3. Hypothesis III stated that there would be no difference between Emergent Reading Levels measured by a

mediated Informal Reading Inventory that focused on vocabulary development, Emergent reading Levels measured by a mediated Informal Reading Inventory that focused on story schema plus vocabulary development, and Emergent Reading Levels measured by a mediated Informal Reading Inventory that focused on both story schema development.

Three multiple regression analyses were used to test for differences between story schema development, vocabulary development, and story schema plus vocabulary development mediated Emergent Reading Levels. Scores used in the analyses were standardized, weighted, and combined across all passage levels, four through seven. Results of the treatment coefficient in the three analyses indicated a significant effect for mediation that focused on vocabulary development or story schema with vocabulary development, and no significant effect for mediation that focused on only story schema development. Hypothesis III was rejected.

4. Hypothesis IV stated that there would be no difference between verbal zones measured by the static Quick Test and verbal zones measured by the mediated Quick Test.

A dependent samples t test was used to test for differences between static verbal zones and mediated verbal zones. Since the test indicated that differences did occur, Hypothesis IV was rejected. Subjects' mediated

verbal zones were significantly higher than their static verbal zones.

5. Hypothesis V stated that there would be no relationship between verbal zone scores measured by the mediated Quick Test and the Emergent Reading Levels measured by a mediated Informal Reading Inventory that focused on story schema plus vocabulary development.

Four multiple regression analyses at passage levels four, five, six, and seven were used to test the relationship between mediated verbal zones and story schema plus vocabulary development mediated Emergent Reading Levels. Results of the test of the mediated verbal zone coefficient at each passage level, four through seven, were not significant, and Hypothesis V was not rejected. No relationship between mediated verbal zones and Emergent Reading Levels that focused on story schema plus vocabulary development was found in this study.

6. Hypothesis VI stated that there would be no relationship between verbal zone scores measured by the mediated dynamic Quick Test and the Emergent Reading Levels measured by a mediated Informal Reading Inventory that focused on the story schema development.

Four multiple regression analyses at passage levels four, five, six, and seven were used to test the relationship between the mediated verbal zones and story

schema mediated Emergent Reading Levels. Results of the mediated zone coefficients at each passage level, four through seven, indicated that no significant relationship existed. Hypothesis VI was not rejected. There was no relationship between mediated verbal zones and Emergent Reading Levels that focused on story schema development.

Conclusions

Five conclusions about Emergent Reading Levels and the verbal zone of proximal development were drawn from the data. These conclusions were based on both the statistical analysis and the reading functioning analysis. The Powell differentiated Informal Reading Inventory (IRI) criteria and the researcher's adjusted IRI criteria for comprehension error ranges were used in the reading functioning analysis. The five conclusions answered the five questions addressed by the study.

1. Was a dynamic testing model effective in exposing students' zones of proximal development for reading functioning?

The most important conclusion was that Emergent Reading Levels represent a zone of mediated reading functioning above the traditional instructional reading level introduced by Betts (1943). Subjects' instructional reading levels were at static IRI passage level three with frustration at levels four, five, six, and seven.

The data indicated that with average and high average third graders, these Emergent Levels encompassed a zone of

four levels upward from the traditional instructional reading level. Experimental group subjects operating in a mediated IRI had Emergent Reading Levels at passage levels four, five, six, and seven, and control group subjects operating in a static IRI had frustration at levels four, five, six, and seven. The concept of Emergent Reading Levels was reaffirmed by this study.

2. Was there a comprehension error range established to interpret Emergent Reading Levels?

The zone of mediated reading functioning was identified using the researcher's adjusted comprehension error range criteria. The researcher's adjusted criteria was 50% to 85% accuracy at passage levels four and five and 55% to 90% accuracy at passage levels six and seven. Individual predicted IRI posttest scores were used to interpret subjects' mediated reading functioning levels.

The data indicated that the traditional instructional reading criteria were inappropriate for analysis of Emergent Reading Levels in that they failed to identify the upper threshold of students' zones of proximal development (Vygotsky, 1962, 1978) for reading.

Eleven subjects in the mediated condition did not reach the traditional criteria of 65% to 90% comprehension accuracy at levels six while only one subject failed to reach the adjusted criteria of 55% to 90% at this level.

At level seven, all 12 mediated subjects reached the old criteria of 65% to 90% comprehension accuracy. Without the adjustment, level six was frustration and levels four and five were Emergent Reading Levels for the mediated subjects. When the adjusted criteria were used, mediated subjects had Emergent Reading Levels at levels four, five, six, and seven.

The researcher concluded that the 10 percentage point adjustment of the comprehension error criteria were established to interpret Emergent Reading Levels. If this adjustment had not been made, reading placement would have been underestimated by at least two levels, from level seven to level five. The adjusted criteria allowed subjects to progress up the IRI passages to highly difficult passage levels without termination of the diagnosis at the traditional frustration level. Consistent with Vygotsky (1962, 1978), subjects' upper threshold of their zones of proximal development were identified when they engaged in a highly challenging reading task with mediation.

3. What type of mediation was most effective in exposing students' Emergent Reading Levels?

Three conclusions were drawn from the data concerning the type of mediation to use when diagnosing Emergent Reading Levels. Across all levels of the IRI posttest passages, from level four to level seven, the story schema

development mediation was ineffective. Vocabulary development mediation was effective, and story schema plus vocabulary development was the most effective method of mediation.

4. Was a mediated verbal zone of proximal development above the static zone exposed?

The static and the dynamic verbal zones used in this study were both measures of subjects' ranges of acceptable language functioning, before language frustration occurred. According to Vygotsky (1978), a word represented a concept and was the basic unit of analysis of the child's language and thought. A verbal language concept identification word list that increased in difficulty was used to identify the verbal zones. Both of these zones were considered a range of "imperfect or incomplete language knowledge" because not all of the words within these areas were correctly identified by the subjects.

As shown in the t test statistical analysis (see Hypothesis IV), the mediated zone was significantly higher than the static zone. The sentence context mediation increased subjects' ranges of acceptable language functioning. It was concluded that subjects' upper thresholds of their ranges of acceptable language functioning, one that contained some unidentified basic language concepts, increased significantly when those

unidentified concepts were put in a sentence context mediation.

5. What was the relationship between the mediated verbal zone and Emergent Reading Levels?

A significant relationship between subjects' dynamic mediated verbal zones and Emergent Reading Levels was not found in this study (see Hypothesis V and VI). This finding helped to clarify the role of social interaction in the mediated situation used to tap the zone of proximal development (Vygotsky, 1962, 1978, 1981).

The sentence context was used to assess the dynamic mediated verbal zone. This type of mediation was designed by the researcher to diagnose subjects' functioning in what Leont'ev (1981) suggested was the common medium, verbal language, that is used in adult-to-child transmission of word meanings or concepts (e.g., classroom direct vocabulary instruction). The mediated verbal zone was a measure of subjects' ranges of acceptable language functioning and not a means of diagnosing subjects' direct adult mediated performance during vocabulary instruction.

The diagnosis of Emergent Reading Levels did include subjects' operating in a mediated situation that contained direct verbal interaction with an adult. Assessment of Emergent Reading Levels was designed to diagnose subjects' direct adult mediated reading performance.

The researcher concluded that, unlike Emergent Reading Levels, students' mediated zone scores were not obtained under the condition of adult-child social interaction. The mediated verbal zones were measures of subjects' independent or unaided functioning in a language context, and Emergent Reading Levels were measures of subjects' mediated reading functioning with adult aid.

Recommendations

This study provided some clarification of Emergent Reading Levels as a viable concept for reading diagnosis and placement. Emergent Reading Levels represented a student's zone of mediated reading functioning above the traditional instructional reading level (Betts, 1943). This zone of mediated reading functioning included the levels a student could achieve with adult or peer aid (Powell, 1982, 1984).

Emergent Reading Levels were consistent with Vygotsky's perspective on educational diagnosis based on the student's zone of proximal development. According to Vygotsky (1962, 1978), diagnosis within the zone of proximal development required that students operate in a mediated situation on a highly challenging learning task. In this study, Emergent Reading Levels were obtained from subjects operating in a mediated situation on passages up to four levels above their traditional instructional reading level. The findings indicated that Emergent

Reading Levels do exist and can be assessed using a mediated Informal Reading Inventory (IRI).

The IRI was introduced by Betts (1943) as a static testing device. It measured how well a student could read and answer comprehension questions on successively leveled passages without any adult aid. Although the comprehension error range criteria for interpreting instructional reading level was altered over the past 40 years (Homan, 1978; Powell, 1970), the IRI remained a static instrument for measuring a student's level of unaided reading performance. The major finding of this study was that the IRI could be used as a dynamic testing instrument for measuring students' range of aided reading performance. The data indicated that adding a mediated situation prior to passage reading and adjusting the comprehension error range criteria for interpreting Emergent Reading Levels transformed the IRI to a dynamic testing instrument.

Vygotsky's theory stressed the role of language, adult facilitation, and adult-child social interaction in learning (Luria, 1978; Luria & Yudovich, 1971; Vygotsky, 1962; Wozniak, 1975). Findings from this study indicated that reading placement at instructional reading level was too low because students could already operate successfully at this level without adult facilitation. Higher Emergent Reading Levels were found to be a more

accurate estimate of placement because students could only operate successfully at these levels with aid.

Heap (1985) suggested that social conventions such as language or reading could not be learned alone, because there could be no conventions in a world of one. He added that the question of how one learns is actually a question of how one learns from, and with, others. Findings in this study indicated that students, collectively operating in a mediated reading situation, performed best when the mediation focused on a story schema plus vocabulary development approach. Mediation that omitted the element of vocabulary development and included adult-child social interaction that focused only on story schema was not an effective means of obtaining students' range of aided reading performance.

The intricate relationship between social interaction and word meanings was also stressed in Vygotsky's theory. He claimed that the original function of a sign is social or a means of communication (Vygotsky, 1981). Leont'ev (1981) helped to clarify this relationship by adding that language is the means of social interaction and a medium for transmitting socially elaborated meanings. In this study, the student's dynamic verbal zone was obtained by presenting unidentified word meanings in verbal language context, a sentence context.

The data indicated that putting the unidentified words in a verbal sentence context elevated the student's

upper threshold of acceptable language functioning. However, the dynamic verbal zone did not relate to students' Emergent Reading Levels, their range of aided reading performance.

Additional research needs to be conducted to further clarify the mediated verbal zone of proximal development. Assessment of the verbal zone which includes social interaction between students and an adult is needed. The relationship between the verbal zone assessed in this manner and Emergent Reading Levels assessed with a story schema plus vocabulary development mediated IRI needs to be investigated.

Further research is also needed to determine the relationship between reading placement at Emergent Reading Levels and classroom reading instruction. Heap (1985) suggests a context-oriented approach to reading instruction based on the material to be read and the purpose of the reading activity. The relationship between reading placement at Emergent Reading Levels and instruction based on the material to be read and the purpose of the specific reading activity also needs further investigation.

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APPENDIX A
RAW DATA

EXPERIMENTAL GROUP

Ss	Static Zone	Mediated Zone	Mental Age	Pretest Levels 3	4	5	6	7
1	22	28	14.0	80	80	70	90	80
2	11	24	13.0	90	60	60	80	70
3	13	22	13.0	90	50	80	90	70
4	13	28	11.5	70	20	80	90	60
5	15	28	11.5	80	40	70	90	80
6	10	13	11.5	90	70	70	70	70
7	10	22	11.0	70	60	30	50	80
8	11	19	11.0	80	30	50	90	60
9	15	32	10.0	100	70	60	70	90
10	7	24	9.5	80	50	50	80	70
11	8	25	9.0	90	40	50	70	70
12	18	36	9.0	90	50	50	80	70

	Story Schema Posttest Levels				Story Schema/Vocabulary Posttest Levels			
Ss	4	5	6	7	4	5	6	7
1	60	60	70	60	70	70	60	70
2	60	80	80	60	80	80	90	100
3	70	60	60	60	60	60	50	70
4	40	80	60	60	60	90	40	70
5	70	70	40	70	100	70	70	90
6	60	90	60	50	50	90	70	80
7	50	60	60	50	60	60	40	100
8	50	30	40	60	50	80	60	80
9	50	90	60	50	80	40	40	90
10	70	40	50	50	50	70	60	90
11	60	70	40	50	50	40	60	80
12	70	60	70	50	90	70	60	80

CONTROL GROUP

Ss	Static Zone	Mediated Zone	Mental Age	Pretest Levels 3	4	5	6	7
13	21	23	14.0	70	40	40	90	70
14	9	19	13.5	80	50	80	80	80
15	14	28	10.0	90	60	60	70	60
16	17	28	11.5	70	30	30	80	90
17	8	23	11.5	80	60	70	90	80
18	10	22	11.0	80	40	60	60	60
19	11	22	11.0	90	30	60	80	80
20	8	22	10.5	90	30	80	80	80
21	11	21	10.5	50	20	50	50	50
22	14	29	9.5	80	40	40	70	80
23	7	18	9.0	100	20	60	90	50
24	14	29	8.5	100	40	50	60	60

	Story Schema Posttest Levels				Story Schema/Vocabulary Posttest Levels			
Ss	4	5	6	7	4	5	6	7
13	70	70	40	60	30	10	10	60
14	50	90	80	70	50	90	40	100
15	10	40	60	50	30	30	10	60
16	50	20	40	70	60	30	10	40
17	90	60	80	80	60	70	30	80
18	50	20	40	40	30	30	50	90
19	30	40	30	60	0	40	10	60
20	60	100	70	60	50	80	40	60
21	20	20	30	30	40	40	20	20
22	70	60	50	70	50	70	20	70
23	40	60	70	50	60	30	0	50
24	30	30	50	50	30	20	30	50

BIOGRAPHICAL SKETCH

Lisbeth Dixon was born in Bloomington, Illinois, on August 7, 1951. She attended public school in Decatur, Illinois, through the fifth grade. She and her family moved to Lake Panasoffkee, Florida, where she continued her schooling. She graduated from South Sumter High School in Bushnell, Florida, in 1969.

Lisbeth attended the University of Florida for two years. She then married and continued her education at the University of South Florida in Tampa, Florida, where she graduated in 1973.

For the next four years, Lisbeth worked for the Sumter County School District. She taught first, second, fourth, and fifth grades in a small rural community school in Coleman, Florida. She also taught and directed the summer Title I reading program for grades one through eight. In 1976, Coleman Elementary School burned to the ground, and she was reassigned to Wildwood Elementary School, also in Sumter County, Florida.

During her employment with the Sumter County Schools, Lisbeth served on a team of three that developed a county reading curriculum. She also served as a county consultant conducting teacher inservice sessions on reading

instruction. Her classroom was used as a "model classroom" for other teachers and administrators to observe techniques of reading instruction and implementation of the reading curriculum.

In 1977, Lisbeth moved with her husband and son to Schweinfurt, West Germany, where her husband was stationed with the military. She taught first and second grades for two years with the DOD Schools in Schweinfurt. During the summers and holidays, Lisbeth traveled extensively in Europe.

Upon returning to the United States, Lisbeth and her family moved Columbus, Georgia, for one year. She taught seventh and eighth grade Title I reading in a Junior High School in Columbus.

In 1981, Lisbeth began graduate studies at the University of Florida. She received a Master's degree in reading in 1981 and entered the Ph.D. program at this time. While working on these degrees, Lisbeth served as a graduate research assistant and a graduate teaching assistant. She received her Ph.D. in Reading Education in 1985.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

William R. Powell, Chairman
Professor of Instruction and Curriculum

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert S. Soar
Professor of Foundations of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Dr. John K. Bengston
Associate Professor of Foundations of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Associate Professor of Educational Leadership

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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